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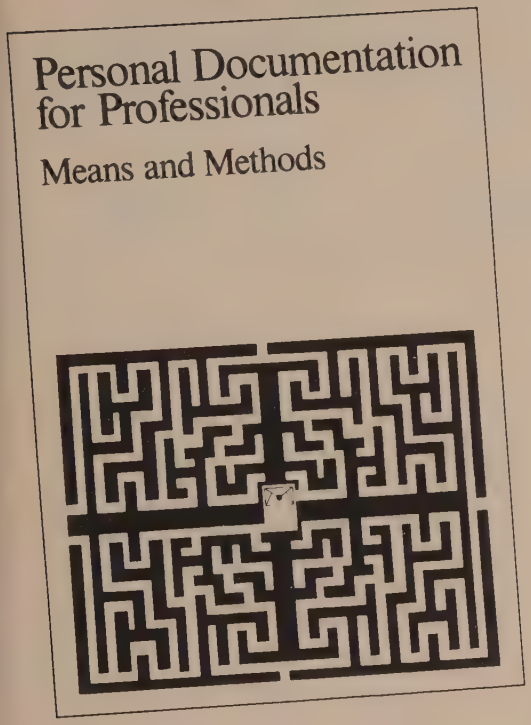

Personal Documentation for Professionals

Means and Methods

by **V. STIBIC**, *Philips, Ltd. Information Systems and Automation, Eindhoven, The Netherlands*

1980 224 pages, 119 fig., 232 ref.
Price: US $29.25/Dfl. 60.00
ISBN 0-444-85480-0

Every professional person - scientist, researcher, technician, manager - owns his/her personal collection of documents (books, reports, journals, cuttings, photocopies, slides, microfiches, drawings, etc.) that must be well organized and accessible at any time. Professionals need their own personal documentation system.

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This useful and absorbing book contains 119 figures and 232 references, and is a **must** for every professional.

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Relativistic Kinetic Theory

Principles and Application

by S. R. DE GROOT, W. A. VAN LEEUWEN *and* Ch. G. VAN WEERT, *Institute of Theoretical Physics, University of Amsterdam, The Netherlands.*

1980 xx + 406 pages. Price: US $73.25/Dfl. 150.00. ISBN 0-444-85453-3

The basic aim of this book is to give a unified treatment of relativistic many-particle systems which are dilute in the sense that two-particle collisions constitute the predominant dynamical mechanism. The discussion relies principally on the relativistic version of Boltzmann's transport equation and the methods of solution of Chapman-Enskog and Maxwell-Grad. These techniques permit a complete discussion of the thermodynamic properties of dilute systems in and near equilibrium. The structure of this monograph is based on the idea that relativistic kinetic theory is part of the larger body of statistical mechanics. The authors also wish to stress that the established principles of statistical mechanics are flexible enough for special relativity to be incorporated without major modifications.

To keep the material as self-consistent as possible the book is divided into four major parts. The relativistic transport equation is introduced heuristically in Part A, in which some elementary thermodynamic concepts are also reviewed. Other topics in this section are the conservation laws and the *H*-theorem.

In Part B the authors have tried to place the relativistic transport equation within the broader discipline of non-equilibrium statistical mechanics: accomplished by deducing it from the underlying dynamics, which in their case is furnished by quantum field theory. In this context also the main probabilistic assumption is introduced.

The central theme of Part C is the derivation of the transport properties of relativistic non-equilibrium systems in terms of the interaction between the constituent particles and state variables. The majority of the results are based on the linearized transport equation for spinless particles, but the extension to systems of spin-½ particles has also been considered.

In Part D the authors calculate the transport coefficients for a number of specific systems playing a role in current astrophysical and cosmological theories. The examples are designed to illustrate the techniques that are needed. They are also meant to be representative of three of the four fundamental forces of nature, namely the weak, the strong and the electro-magnetic interaction. Gravity has been omitted from the discussion altogether as it appears in the transport equation as a self-consistent force, which yields no contribution to the transport coefficients.

CONTENTS: Preface. Table of Contents. Historical Background. **Parts: A. Basic Equations.** *Chapters:* I. Elements of Relativistic Kinetic Theory. II. Conservation Laws and *H*-Theorem. **B. Derivation of the Transport Equation.** III. Scalar Particles. IV. Spin-½ Particles. **C. Linear Theory.** V. First Chapman-Enskog Approximation. VI. Transport Coefficients. VII. Moment Method. VIII. Propagation of Sound Waves. IX. Mathematical Aspects of the Linearized Transport Equation. **D. Applications.** X. Lepton Systems. XI. Systems of Hadrons. A Model. XII. Photon-Electron System. XIII. Reduction of the Collision Brackets. Bibliography. Author Index. Subject Index.

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